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GERMANY'S SYSTEM OF TECHNICAL AND COMMERCIAL EDUCATION.

BY WOLF VON SCHIERBRAND.

THE thoroughness and completeness of Germany's system of technical and commercial education are the features by which it is most distinguished from those of other countries. Its foundation is laid securely and broadly, and from the bottom upwards there is a well-graduated structure, terminating in what Mr. Gastrell, commercial *attaché* to the British embassy in Berlin, in one of his official reports, calls "the coping-stone to business education as a whole," namely, the new commercial high schools or, rather, universities. Neither England nor France, Germany's chief commercial rivals in Europe, has remained idle in this matter while Germany has been forging to the head. In both these countries, much has been done in emulation of the Empire, and the results attained by them must not be minimized. But there is, as intimated above, this difference: England's efforts to atone for a century of educational neglect are, as yet, neither centralized nor of uniform type, producing haphazard and uneven results; and France's edifice of commercial and technical education has a fine apex but an indifferent connecting substructure. As regards this country, there is rather a striking resemblance with England in this respect.

But let us guard against a very wide-spread error. It is not true that Germany's amazing rise, during the past score of years, as a great commercial and industrial World Power is due to, and was preceded by, this thorough intellectual training of her sons. In a British Foreign Office report, of November, 1897, on "Commercial Education in Germany," this statement is made:

"The commercial success of the German nation is not the outcome of commercial education; the latter is rather the offspring of that success,

which has opened the eyes of the Chambers of Commerce to the immense value of commercial education for a commercial people. Therefore, the wonderful increase of commercial schools is a result, and not one of the sources, of the trade successes of Germany. About ten years ago the state of mercantile education was not a very high one."

This statement is borne out by the facts. The commercial afflatus, so to speak, came first and was eminently effective for divers reasons; the specialized instruction to fit the young generation for these novel and strenuous, but more favorable, conditions came afterwards. Synchronous, however, with the rapid growth of special technical and commercial schools has been the even more rapid increase in Germany's foreign trade and in her manufacturing development. For, since 1887, the year from which dates this educational enterprise, the foreign trade of Germany has more than doubled. Thus, then, the incidental proof is strong that, with a new educational armor of greater efficiency, the initial success has not only been maintained against the competition of the world, but that it has been further accelerated.

It will repay the trouble to examine somewhat in detail this wonderfully homogeneous system of Germany's specialized schools.

At present, there are in active operation within the Empire 9 technical high schools, 3 mining academies, 4 commercial high schools, and 587 middle and lower grade industrial, technical and commercial schools and colleges, 536 of the latter being public and 51 private. These institutions are pretty thoroughly scattered all over Germany. There are 297 of them in Prussia, with her 38 millions, while little Saxony, with barely four million population, can boast of no less than 121 (of which 64 are commercial schools). Saxony, indeed, takes the lead in this development, the first efficient institutions of the kind having been founded by her Government.

Now, these middle and lower grade schools are of the most varied character and aims, and we find in Bavaria, for instance, no fewer than six public schools aided by the state government, in which wood-carving and wood-sculpture are taught, and others where instruction in pottery, glass-making, drawing, spinning, etc., is imparted, while also in Bavaria and elsewhere special institutions exist for brewers (the one in Munich being probably the best in the world, pupils coming to it all the way from Australia, America, Russia, even from China and Japan), lace-

makers, tailors and cutters, flour and saw millers, stone-cutters, masons, photographers, lithographers, basket-weavers, sailors, ship-builders, milliners and modistes, textile workers, etc. About one-half the total number, though, are commercial schools of various grades.

Generally speaking, the aim of the higher-grade technical school is the fitting of managers, technical directors, etc., of large establishments, and of owners, agents, etc., of smaller ones. Pupils on entering must possess a sum of theoretical knowledge about equalling that of graduates of our best high schools or smaller colleges. In addition to the imparting of further booklore, is the practical training in shops, laboratories, or experimental stations, usually connected with the institution itself. The average duration of the courses is three years. The lower-grade schools purpose turning out young men efficient enough to become lower officers and higher employees in large establishments, of foremen and master mechanics, and of future owners or partners in small technical or industrial workshops.

Apart from these schools, and not included in the number given above, are the so-called *Fortbildungsschulen*, or commercial and technical continuation schools. Of these there is one in almost every town of any size, and their province is to give apprentices, while learning their trade, an opportunity to acquire those theoretical branches, especially drawing, mathematics, languages, which will enable them to rise eventually in the scale of their work. The fees to be paid are uniformly small, not exceeding 50 or 90 marks *per annum* (about 12 to 21 dollars), and in many cases they are reduced or wholly omitted. It has been found most expedient to give the lessons either in the early morning, from seven to nine (before business hours), or else in the afternoon between two and four, in which latter case the consent of the employer must be obtained, and is scarcely ever withheld. This type of school differs, of course, a good deal according to circumstances. Thus, some of them are maintained by the efforts of the body of those benefited. This is the case in Hamburg, where the *Verein für Handlungskommis* (Society of Commercial Clerks) wholly pays for the upkeep of a continuation school, in which six modern languages are taught, namely, Danish, Russian, English, French, Spanish, and Portuguese. The average course of these schools lasts three years, coinciding with the terms

of apprenticeship; but in Saxony the course is one of four years. Saturdays and Sundays are free from lessons. With many thousands of German lads these schools afford the only chance to fit themselves for better-paid work.

A fair showing of what the higher-grade commercial school teaches is furnished by the curriculum of the institute at Leipzig, as follows:

	First Year.	Second Year.	Third Year.
German	4	3	3
English	5	4	3
French	5	4	3
Mathematics	3	3	3
Mercantile arithmetic	5	3	2
Physics	3	2	..
Technology	..	..	2
Chemistry	..	2	2
Study of commodities.....	..	..	1
Geography	2	2	2
History	2	2	2
Commercial science	..	2	2
Counting-house work	..	2	..
Correspondence	..	..	2
Bookkeeping	..	..	2
Political economy	..	..	2
Drawing	2	2	..
Gymnastics	2	2	..
Lessons per week.....	33	33	31
Non-obligatory Subjects:			
Italian	..	2	2
Shorthand	2	1	1

It will be noticed in this list that the use of the typewriter forms no part of this curriculum at all, and that shorthand is optional, whereas in this country, for example, both these accomplishments would be considered as indispensable to a thorough modern business education. The typewriter, however, is not yet a very popular instrument in Germany, and the more leisurely business methods dispense, in many cases, with the use of shorthand. The aim is, quite evidently, to give a thorough all-around education to the embryo merchant, with such special knowledge as he will require some time in the future. Hence the great emphasis on modern languages, history, geography, chemistry, physics, drawing.

Tuition fees are low at all German schools and universities; for the higher and lower grade technical and commercial schools they average between twenty and fifty dollars *per annum*. Of course,

these fees are not sufficient to maintain the schools, nearly all of which are in the enjoyment of certain endowment funds, as well as of state or municipal aid.

After graduating from one of these lower technical schools or else, more commonly, on completing the course of nine years at one of the "*gymnasiums*" (colleges), "*real-gymnasiums*" (colleges where more attention is paid to modern languages, physics, chemistry, etc.), or "*real-schulen*" (colleges wherein classics are not taught at all), the pupil enters one of the technical high schools. There are nine of them, respectively at Berlin, Dresden, Brunswick, Aix-la-Chapelle, Darmstadt, Hannover, Karlsruhe, Munich, and Stuttgart. Together, these institutions have an average annual attendance of about 20,000, whereof Berlin has 4,464, Munich 3,226, Karlsruhe 2,187, Hannover 2,065, etc. Diplomas are granted (after an average three or four years' course and a successful final examination) in architecture, structural engineering, mechanical engineering, electro-technics, industrial and administrative engineering, surveying, forestry, or in several of these branches at once. The title of "*Diplom-Ingenieur*" is conferred upon those who have shown themselves possessed of a sufficient scientific grounding to enter their chosen field with some distinction. Since 1899, the centenary of the Berlin institution, by authority of the Kaiser, technical high schools are also empowered to grant the degree of "*Doktor-Ingenieur*" to those graduates who, on the strength of a dissertation embodying original research, have proved themselves worthy of it. In Bavaria, the degree thus acquired is called "Doctor of Technical Sciences." The social student life at these technical high schools is closely modelled after that at the German universities. The average cost of a three years' course at one of them varies between 800 and 1,500 dollars, with the greater frequency inclining towards the first-named figure, which would make the average individual expense (everything included) about 300 dollars *per annum*. Between 20 and 25 per cent. of the attending students are foreigners, Russians furnishing the largest quota, with English-speaking students next in number.

A special field is covered by the high schools and academies for mining (3, situated, respectively, in Berlin, Clausthal, and Freiberg), forestry (5, respectively, in Münden, Eberswalde, Tharandt, Aschaffenburg, Eisenach), agriculture (4, located, respectively, in

Berlin, Bonn, Hohenheim, and Weihestephan), veterinary surgery (5, in Berlin, Hannover, Munich, Dresden, and Stuttgart), and applied art (13, of which three are in Berlin, and one each in Düsseldorf, Cassel, Königsberg, Munich, Dresden, Breslau, Frankfurt-on-Main, Stuttgart, Karlsruhe and Weimar).

However, of greatest interest, doubtless, are the new commercial high schools, because they express most clearly the latest phase of this educational development as well as the strongest longing of the material side of the German modern mind, the longing for commercial hegemony. The movement for the establishment of these institutions can be traced, in its first beginnings, to 1879. At the head of it at that time was the late Gustav von Mevissen, a wealthy, progressive and brainy "captain of industry" in the Rhine district. However, the first commercial high school was the one in Leipzig, founded late in 1898, and this was followed, a year or two later, by others started in Cologne, Frankfurt-on-Main, and Aix-la-Chapelle. At present, the success of the first three named is firmly enough grounded to show that institutions of this kind will be an important factor hereafter in accounting for German aspirations. The establishment of similar institutions at Berlin, Rostock, Hamburg, Hannover and Düsseldorf is under consideration.

The earliest, the one at Leipzig, began with an attendance of 95, of which 20 were foreigners. The attendance had grown by 1904 to 561, of whom 298 were Germans, 263 foreigners. The noted Professor Hermann Raydt has been its rector from the start. In his prospectus he states the aim to be a twofold one, viz.:

- "(1) To give to young men who already possess a certain degree of mental maturity, a wide and thorough general and commercial culture;
- "(2) To give to professors and teachers already instructing in commercial schools, an opportunity to perfect themselves theoretically and practically in any particular branch."

Among those admitted as hearers to lectures are students of Leipzig University. A very large percentage of the attendants, however, is drawn from among teachers and professors as well as graduates of other institutions. The principal subjects taught are theoretical and practical political economy, including coinage, weights, measures, banking and stock-exchange business, com-

mercial politics, commercial statistics, credits, transportation, and insurance; the science of finances, including taxation, public credit, and customs duties; knowledge of substances of goods and technology; commercial geography, economic history, general law knowledge, commercial law, law of exchange and maritime law, law of bankruptcy, international law, colonial policy, etc. Eight modern languages may be studied in more advanced stages.

The institution at Cologne, inaugurated in 1900, is similar in scope to the one in Leipzig. Its attendance is now about 1,100, whereof, however, only about 300 are matriculated, while the remainder are mere auditors, even women being admitted on certain conditions. The school in Cologne came into being on the strength of a foundation fund of about 5,000,000 marks donated by Mevissen, besides which the municipal government of Cologne contributes annually a sum of \$10,000 or more.

A year later, in 1901, the Academy of Social and Commercial Sciences was started at Frankfort-on-Main. This institution is somewhat different in scope, being intended to benefit not only persons in commercial pursuits, but also administrative officials, public and private, and others. An endowment fund of 2,000,000 marks from the K. C. Jügel estate, as well as smaller bequests and municipal aid, largely pay expenses. The curriculum is nearly the same as at the Leipzig institution, and the attendance is at present about 500. The institution at Aix-la-Chapelle, probably owing to the proximity of Cologne, is not in a flourishing condition, and will ere long probably be merged in the other.

One feature is common to all these commercial high schools. The students are taught how to think independently for themselves. They have taken the word of Goethe for motto: "*Ich wüsste nicht, wessen Geist grösser und gebildeter sein müsste als der Geist eines echten Kaufmanns*" ("I do not know whose mind ought to be larger and more cultured than the mind of a real merchant"). And a French authority, X. Torau-Bayle, lately wrote, in the "*Revue de Paris*," that "the structure of technical education in Germany is complete from the bottom up—that is its great superiority."

But there are many voices in Germany herself lifted up against this theoretical excellence. A number of German authorities of the first rank, among them Professor Fick, claim that an organized attempt to teach commerce theoretically in all its branches,

from the lowest to the highest, has more evil than good in its wake, and that "captains of industry" are born, not artificially trained. There may be something in this view of the case, and details are not lacking to incline the impartial observer to the belief that, for many ambitious and able young men, the overburdening of the head with formulas and cut-and-dried theory about trade and industry means to rob them of much of their initiative and originality of mind. But then, say the defenders of this thorough system of drilling, the students visiting the commercial high schools are but a very small percentage of the German (and foreign) youth who annually turn to mercantile pursuits as their chosen field. Largely these young men are the sons of wealthy or well-to-do merchants, manufacturers, ship-owners; and the higher point of view they are taught to take in respect of trade, by means of these special studies, the wider horizon that opens for their minds, will do much hereafter for them when they themselves come to assume direction of affairs. Probably, again, there is much in this claim. At any rate, it will be interesting to watch events and to note whether the friends of these new institutions have predicted aright. There is a general opinion abroad that Germans, as a nation, are inclined to attach too much weight to purely theoretical knowledge. Still, there is no denying that the schoolmaster was the victor both at Sadowa and Sedan, and that the better theoretical equipment of the young German merchant, manufacturer, and technician has stood them in good stead during the last two decades in overcoming all the natural disadvantages of soil and climate of their country in the open-to-all race for the capture of the world's trade.

As an illustration of this, perhaps, it deserves mention that we on this side of the water, though usually showing but scant respect for theoretical aids to trade, first adapted one such aid to the uses of our growing foreign commerce. I refer to the Commercial Museum at Philadelphia, a model institution which the Germans made haste to imitate at once. Every American export manufacturer and trader admits the immense benefit which this Philadelphia institution has been to the nation at large. Similar museums now exist in a half-dozen of the industrial centres of Germany, and together they are doing much to help the nation in its dealings with foreign customers. These museums, too, might be called so many schools. WOLF VON SCHIERBRAND.